

COMPLETE LISTING OF THE CLAIMS:

Claims 1-20 : (Canceled)

Claim 21 : (Currently Amended) ~~The strain sensor according to claim 20,~~
~~in which~~ A strain sensor, comprising: an optical waveguide having a plurality of reflecting
structures spaced lengthwise along the waveguide, each reflecting structure having a reflectivity for
reflecting light at a different characteristic wavelength which changes in dependence upon a change
of physical length of at least part of the respective reflecting structure, the reflectivity of reflecting
structures which reflect at characteristic wavelengths which are adjacent to each other being different
for discriminating between adjacent reflecting structures, the reflecting structures which reflect at
adjacent wavelengths are being configured such that one of the reflecting structures reflects the light
at one characteristic wavelength, and the reflecting structure adjacent in wavelength ~~is~~ being
configured to reflect the light at two characteristic wavelengths.

Claim 22 : (Previously Added) The strain sensor according to claim 21,
in which the reflecting structure which reflects the light at two wavelengths is configured such that
the two characteristic wavelengths re separated by at least a width of the reflectivity of the reflecting
structure which reflects at the adjacent wavelength.

Claim 23 : (Currently Amended) The strain sensor according to claim 20
21, in which the optical waveguide comprises an optical fiber.

Claim 24 : (Currently Amended) The strain sensor according to claim 20
21, in which each reflecting structure comprises a grating structure having a pitch, and wherein a
change in the characteristic wavelength is in consequence of a change in the pitch of the grating
structure.

Claim 25 : (Previously Added) The strain sensor according to claim 24, in which each grating structure comprises a Bragg grating.

Claim 26 : (Previously Added) The strain sensor according to claim 24, in which the optical waveguide is an optical fiber that includes a photo-refractive dopant, and in which each grating structure is optically written into the optical fiber.

Claim 27 : (Previously Added) The strain sensor according to claim 26, in which the optical fiber comprises silica doped with germanium oxide.

Claim 28 : (Previously Added) An apparatus for measuring strain, comprising: a strain sensor including an optical waveguide having a plurality of reflecting structures spaced lengthwise along the waveguide, each reflecting structure having a reflectivity for reflecting light at a different characteristic wavelength which changes in dependence upon a change of physical length of at least part of the respective reflecting structure, the reflectivity of reflecting structures which reflect at characteristic wavelengths which are adjacent to each other being different for discriminating between adjacent reflecting structures; a light source operable for applying the light to the waveguide, the light having a wavelength range which covers at least a range of wavelengths over which the reflecting structures reflect; and detector means for determining a change of characteristic wavelength at which the reflecting structures reflect light, the change being indicative of a change in length of at least a part of the respective reflecting structure.

Claim 29 : (Previously Added) The apparatus according to claim 28, in which the detector means determines the change in characteristic wavelength by measuring the wavelengths at which the strain sensor reflects the light.

Claim 30 : (Previously Added) The apparatus according to claim 28, in which the detector means measures the light transmitted by the strain sensor and determines the change of characteristic wavelength by measuring the change in wavelength at which light transmission is attenuated.

Claim 31 : (Previously Added) The apparatus according to claim 28, in which the detector means further comprises means for utilizing a relative magnitude of an intensity of reflected light or a relative magnitude of an intensity at which light transmission is attenuated to discriminate between the reflecting structures which are adjacent in wavelength.

Claim 32 : (Previously Added) A method of measuring strain, comprising the steps of: providing a strain sensor including an optical waveguide having a plurality of reflecting structures spaced lengthwise along the waveguide, each reflecting structure having a reflectivity for reflecting light at a different characteristic wavelength which changes in dependence upon a change of physical length of at least part of the respective reflecting structure, the reflectivity of reflecting structures which reflect at characteristic wavelengths which are adjacent to each other being different for discriminating between adjacent reflecting structures; applying the light to the waveguide, the light having a wavelength range which covers at least a range of wavelengths over which the reflecting structures reflect the light; and detecting a change in the characteristic wavelength at which the reflecting structures reflect the light.

Claim 33 : (Previously Added) The method according to claim 32, and further comprising the step of detecting the change in the characteristic wavelength by measuring the wavelengths at which the strain sensor reflects the light.

Claim 34 : (Previously Added) The method according to claim 33, and further comprising the step of detecting the change in the characteristic wavelength by measuring the wavelengths at which the transmission of the light through the strain sensor is attenuated.

Claim 35 : (Previously Added) The method according to claim 34, and further comprising the step of detecting a relative magnitude of an intensity of reflected light or a relative magnitude of an intensity at which transmitted light is attenuated to discriminate between the reflecting structures which are adjacent in wavelength.

Claim 36 : (Previously Added) The method according to claim 32, and further comprising the step of sweeping the wavelength of the light applied to the strain sensor.

Claim 37 : (Previously Added) The method according to claim 32, in which, when it is desired to measure the strain within an object, further comprises the step of securing a part of the waveguide having at least a part of one of the reflecting structures to the object such that a change in a physical length of at least a part of the object causes a change in a physical length of at least the part of the one reflecting structure.

Claim 38 : (Previously Added) The method according to claim 32, in which, when it is desired to measure a temperature of an object, further comprises the step of placing a part of the waveguide having at least a part of one of the reflecting structures in thermal contact with the object such that a change in the temperature of the object causes a change in a physical length of at least the part of the one reflecting structure.

Claim 39 : (New) A strain sensor, comprising: an optical waveguide having a plurality of reflecting structures spaced lengthwise along the waveguide, each reflecting structure having a reflectivity for reflecting light at a different characteristic wavelength which

changes in dependence upon a change of physical length of at least part of the respective reflecting structure, the reflectivity of reflecting structures which reflect at characteristic wavelengths which are adjacent to each other being different for discriminating between adjacent reflecting structures; and detector means for determining a change of characteristic wavelength at which the reflecting structures reflect light, the change being indicative of a change in length of at least a part of the respective reflecting structure.

Claim 40 : (New) The strain sensor according to claim 39, in which the detector means determines the change in characteristic wavelength by measuring the wavelengths at which the strain sensor reflects the light.

Claim 41 : (New) The strain sensor according to claim 39, in which the detector means measures the light transmitted by the strain sensor and determines the change of characteristic wavelength by measuring the change in wavelength at which light transmission is attenuated.

Claim 42 : (New) The strain sensor according to claim 39, in which the detector means further comprises means for utilizing a relative magnitude of an intensity of reflected light or a relative magnitude of an intensity at which light transmission is attenuated to discriminate between the reflecting structures which are adjacent in wavelength.